Overview of a Prospective DER Hybrid Energy Systems Program

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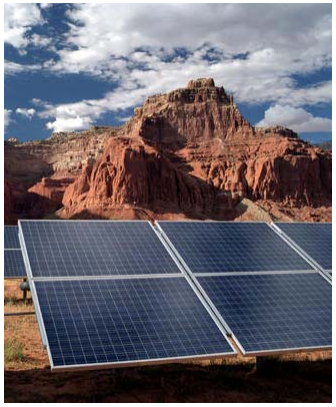
1st DOE DER Conference and Peer Review
Washington, DC
November 30, 2001





Evaluating a DOE Hybrids Program

- Assemble Team
- Inventory DOE activities
- Identify potential hybrid combinations (the matrix)
- Evaluate new opportunities for hybrids and identify R&D needs
- Produce two reports in FY 2001
  - Recommendations for Hybrid Energy Systems Program
  - Report to Congress on Partnerships

Hybrids Assessment Team

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Randy Hudson, Oak Ridge National Laboratory

Chris Cameron, Sandia National Laboratories

Merwin Brown, National Renewable Energy Laboratory

Joe Iannucci, Distributed Utility Associates

Jonathan Hurwitch, Sentech, Inc.

What are Hybrid Energy Systems?

- A hybrid system is an interconnected energy system that is any combination of at least two *distributed* energy technologies, or a single *distributed* technology operated from multiple fuels.

- Hybrid energy systems can be optimized to address value propositions such as higher reliability, enhanced efficiency and/or lower emissions -- at an acceptable cost.

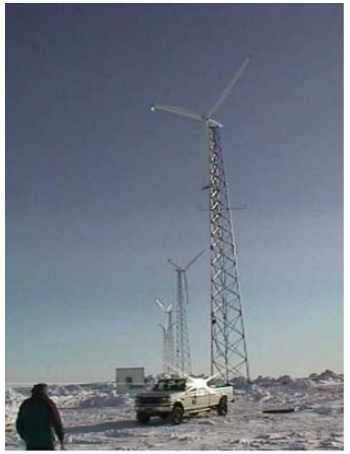
Distributed Hybrid Systems Definition

Characteristics of *Distributed* Energy Resources:

- Located at or near Point of Use
- Locational Value
- Distribution Voltage

Microturbine/Storage

Microturbine/Chiller



Wind/Engine

Why is there interest in Hybrid Systems?

- Hybrids offer an opportunity to integrate a technology and its inherent attributes with other technologies to overcome weaknesses and emphasize strengths.

- Optimized hybrid energy systems can be designed to emphasize specific value propositions that can be important factors for customers.

Value Propositions

Renewables

Storage

Hybrid System

Value Propositions:

High Reliability

High Efficiency

Low Emissions

Acceptable Cost

The whole is greater than the sum of its parts.

Fossil Fuel Generators

Power Electronics

Why Institute a DER Hybrids Program?

- There are existing and emerging markets for *distributed* hybrid energy systems which have not been fulfilled due to real and perceived barriers.

- There are promising hybrid technology combinations which are not currently being developed.

Benefits to OPT

- A Hybrid Energy Systems Program can create market opportunities for emerging technologies before they are mature.

- Hybrid energy systems can open markets not currently available to DER due to limitations in the individual technologies.

- Hybrid energy systems will build capacity toward the DER program goal of 20% of new additions by 2020.